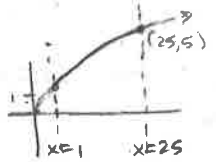
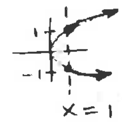
Chp. 2-3SL Review

Name Key

1. State the domain and range of the following relations.



a) $\{(x,y): y^2 = x, x \geq 1\}$



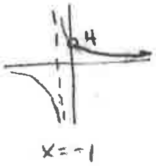
d: $[1,\infty)$

r: $(-\infty,-1]\cup[1,\infty)$

b) $y = \sqrt{x}, 1 \leq x \leq 25$

d: $[1,25]$

r: $[1,5]$



c) $y = \frac{4}{x+1}, x > 0$

d: $(0,\infty)$

r: $(0,4)$

2. Determine the implied domain for each of the following relations.

i) $y = \frac{a}{\sqrt{x}-a}, a > 0$

$[0,\infty[\ \setminus \{a^2\}$

$x \geq 0$

$\sqrt{x} - a = 0$

$\sqrt{x} = a$

$x \neq a^2$

ii) $y = \sqrt{16-x^2}$

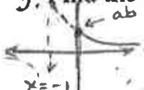
$16 - x^2 \geq 0$

$16 \geq x^2$

$-4 \leq x \leq 4$

$[-4,4]$

3. Find the range of the following relations.



fraction = 0 when numerator = 0 but it won't ever

dom

a) $y = \frac{ab}{x+1}, \boxed{x \geq 0} ab > 0$

$y = \frac{+\#}{+\#\text{'s} \geq 1}$

r: $[0, ab]$

largest outcome when $x = 0$.

b.) $y = \frac{2a}{\sqrt{a^2-x}}, a < 0$

dom: $x \neq a^2$

a is negative

$y = \frac{-\#}{+\#}$ always a negative number, can't be zero because $a<0$

r: $(-\infty, 0)$

4. A function is defined as follows, $f: x \mapsto 2x+3, x \geq 0$.

(a) Find the value of $f(0), f(1)$.

$f(0) = 2(0) + 3 = 3$

$f(1) = 2(1) + 3 = 5$

(b) Find $\{x: f(x) = 9\}$.

$2x + 3 = 9$

$2x = 6$

$x = 3$

(c) Evaluate the expressions

i) $f(x+a)$

$2(x+a)+3$

$2x + 2a + 3$

ii) $f(x+a) - f(x)$

$2x + 2a + 3 - (2x+3)$

$2a$

5. All of the following functions are mappings of $\mathbb{R} \mapsto \mathbb{R}$ unless otherwise stated.

(a) Determine the composite functions $(f \circ g)(x)$ and $(g \circ f)(x)$, if they exist

(b) For the composite functions in (a) that do exist, find their range.

5.4.1 3iii

$d_f: \mathbb{R}$ $\quad d_g: \mathbb{R}$

$r_f: [0,\infty[$ $\quad r_g: \mathbb{R}$

$f(x) = (x+2)^2, g(x) = x-2$

a) $(f\circ g)(x) = (x-2+2)^2$

$= x^2$

$r_g \subseteq d_f$ exists

$d = d_g: \mathbb{R}$

b) r: $[0,\infty[$

$(g\circ f)(x) = (x+2)^2 - 2$

$= x^2 + 4x + 4 - 2$

$= x^2 + 4x + 2$

vertex (-2,-2)

$r_f \subseteq d_g$ exists

$d = d_f: \mathbb{R}$

b) r: $[-2,\infty[$

3ix

$d_f: \mathbb{R}$ $\quad d_g: \mathbb{R}$

$r_f: \mathbb{R}$ $\quad r_g: [0,\infty[$

$f(x) = x^3 - 2, g(x) = |x+2|$

a) $(f\circ g)(x) = |x+2|^3 - 2$

$r_g \subseteq d_f$ exists

$d = d_g: \mathbb{R}$

b) GCD:

r: $[-2,\infty[$

a) $(g\circ f)(x) = |x^3 - 2 + 2|$

$= |x^3|$

$r_f \subseteq d_g$ exists.

$d = d_f: \mathbb{R}$

b) GCD:

r: $[0,\infty[$

6. Find x so that the distance between points (-2, 1) and (x, -3) is $4\sqrt{2}$.

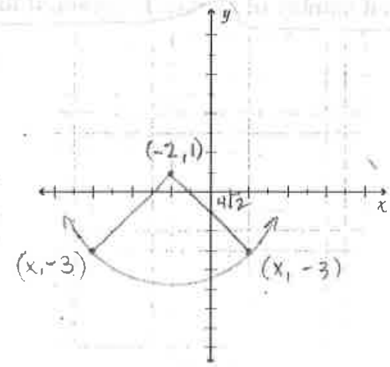
$\left(\sqrt{(x+2)^2 + (-3-1)^2}\right)^2 = (4\sqrt{2})^2$

$x^2 + 4x + 4 + 16 = 16 \cdot 2$

$x^2 + 4x - 12 = 0$

$(x+6)(x-2) = 0$

$x = -6, 2$



2 answers makes sense